



UNIVERSITY
OF
LUSAKA

**AN INVESTIGATION OF FLOODS EFFECTS ON COMMUNITY
RESILIENCE STRATEGIES IN UNPLANNED SETTLEMENTS: A CASE
STUDY OF KANYAMA COMPOUND, LUSAKA**

A DISSERTATION

**Submitted to the School of Technology and Social Sciences and in partial fulfilment of the
requirements for the award of Bachelor of Arts in Development Studies.**

MULENGA CHOLA

BDS22113054

SUPERVISED BY:

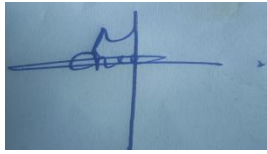
MS. MUKASAMI MONDE MWANANGOMBE

2025

DECLARATION

I, Mulenga Chola, certify that this study, "An Investigation of Floods Effects on Community Resilience Strategies in Unplanned Settlements: A Case Study of Kanyama Compound, Lusaka" is entirely original. It has been completed in compliance with the University of Lusaka's (UNILUS) academic policies and ethical standards. This work has not been submitted to this or any other higher education institution for consideration for any other degree or academic credential. Every information source utilized in this work has been properly cited and acknowledged using the recommended academic referencing style.

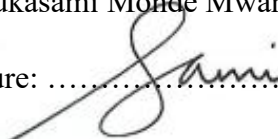
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Student Signature:

Date: 25th, February, 2026.

Ms Mukasami Monde Mwanangombe (Supervisor)

Signature:

Supervisor

Date: 26th February 2026

ABSTRACT

Flooding is a major environmental challenge in unplanned settlements, significantly affecting livelihoods, infrastructure, and community well-being. In Lusaka, Zambia, Kanyama Compound is highly prone to recurrent floods, which damage homes, disrupt economic activities, limit mobility, and increase health risks. Local communities have developed resilience strategies to cope with these challenges, but the effectiveness of these measures, particularly drainage systems, early warning dissemination, and household-level interventions such as raising floor levels, remains underexplored. This study investigated the effects of flooding on community resilience strategies in Kanyama Compound, focusing on these three key approaches.

A descriptive research design was employed, using qualitative methods and quantitative data where necessary (mixed-method). Primary data were collected through structured interviews and surveys with 25 purposively selected respondents from a population of 525,902 residents. Participants were chosen based on direct experience with flooding and active involvement in community resilience initiatives. Secondary data were obtained from policy documents, academic journals, and reports on flood management and disaster risk reduction. The specific objectives were: to examine the effects of floods on drainage systems as a community resilience strategy; to assess the effectiveness of disseminating early flood warning systems; and to identify the role of raising floor levels in reducing flood impacts on households.

Thematic analysis revealed that poorly maintained and insufficient drainage systems worsened flood impacts, while communities engaged in drainage maintenance experienced relatively reduced waterlogging and hazards. Early warning systems were crucial in enhancing preparedness, enabling timely protective measures, evacuation, and reduced property and livelihood losses. Raising floor levels provided partial protection for household assets but was limited by financial constraints and housing structures. Overall, community-driven strategies contributed to resilience but were constrained by weak infrastructure, limited resources, and minimal institutional support.

The study concludes that sustainable flood resilience in unplanned settlements requires coordinated efforts from communities, local authorities, disaster management institutions, and other stakeholders. Recommendations include improving drainage infrastructure, expanding early warning dissemination, promoting household-level adaptation measures such as raised floors, and strengthening institutional support for disaster risk reduction. Future research should

consider comparative studies across unplanned settlements, assess long-term resilience outcomes, and evaluate the effectiveness of policy interventions in mitigating flood impacts.

Keywords: Effects of floods, unplanned settlements, Kanyama Compound, Lusaka District, community resilience strategies, drainage systems, early warning systems, raised floor levels

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DEDICATION

This research study is dedicated to my dear parents, in appreciation of your unwavering love, selflessness, wisdom, and unceasing effort. Thank you for encouraging me to perform my level best in my academics, I would not be here without you, I love you both, and may God grant all your desires amen.

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ABBREVIATIONS

WHO - World Health Organization

UNICEF - United Nations Children's Funds

ADB - Africa Development Bank

WASH - Water Sanitation and Hygiene

SMES - Small Medium Enterprises

DRR - Disaster Risk Reduction

UNDRR - United Nations Office for Disaster Risk Reduction

NGO - Non-Governmental Organization

UN - United Nations

CHAPTER ONE:

1.1 Introduction

The chapter emphasizes the background of the study, statement of a problem, general objectives specific objectives and research questions, emphasizes the significant of the study and scope, clarifies the boundaries and restrictions, and concludes with definitions of important words. The objective is to investigate how floods affect community resilience strategies in unplanned settlements, focusing on three main aspects, firstly, to examine the effects of floods on drainage systems as a community resilience strategy, secondly, to access the effects of disseminating early flood warning systems, and lastly, to identify the effectiveness of raising floor levels in reducing flood effects on households. By examining these factors, the study aims to provide insights that can inform policy, planning, and community-based interventions to mitigate the impact of flooding in Kanyama Compound.

1.2 Background of the study

Flooding is one of the biggest environmental problems in Lusaka, Zambia (Peter, 2021). It primarily impacts towns that were built without adequate planning, especially those that are located on low-lying terrain or along natural drainage routes (Catherine et al., 2020). Since Zambia's independence, Lusaka has experienced rapid urbanization. Many people have built houses in flood-prone areas due to limited access to safer land (Micheal, 2009). In the meantime, the city's roadways and drainage systems have not kept up with the population development. According to (Mulenga. 2021) and (UN-Habitat, 2020), flooding has become more common and destructive due to severe rainfall, blocked drains, and poor maintenance. Major flooding incidents have been documented as early as the late 1970s in Kanyama Compound, one of Lusaka's biggest and most densely populated unplanned communities.

In the year 1977 and 1979, Kanyama experienced severe floods that destroyed houses, displaced hundreds of residents, and eleven people died which caused loss of life. These floods drew public attention to the dangers of constructing houses on wetlands and natural drainage lines

(Sinkala, 2010). Uncontrolled urban expansion, inadequate waste management, and poor drainage further increased the area's vulnerability to flooding (Habasonda, 2012).

In 1988-1989 another major flood disaster caused an estimated reports shows 5000 houses collapsed in Lusaka district, as Kanyama one of the most affected areas, and 50 000 become homeless and two deaths were recorded (Matildah and Kabwe, 2020). In addition, 1991 to 1999, flooding during these periods led to sanitation problems, like overflowing pit latrines and water contaminations. These conditions contributed to major cholera outbreaks in Kanyama Compound.

Between 2000 and 2005, flooding in Kanyama caused significant infrastructure damage and increased health risks (Wilma, 2007). During this period, the Government and NGOs become more actively involved in efforts to mitigate the effects of flooding by providing emergency relief, improving drainage channels, and promoting community awareness (Adrian, 2015). The years 2005 and 2010 floods become more serious, in 2009 during the rainy season, 565 houses were destroyed, 8,423 were partly damaged, and 27,219 were in floods, this showed how vulnerable the community was, although responses were still weak at that time, they slowly improved, (Nchito, 2007). Locals faced serious health risks as a result of the ongoing seasonal flooding (Chileshe, 2018). The region's floods were made worse by many episodes of intense rainfall between 2010 and 2015. Community-based drainage cleaning projects, NGO-led water, sanitation, and hygiene (WASH) programs, and municipal interventions were put into place to reduce the effects of flooding (UN-Habitat, 2011; IPS News, 2011). However, community strategies were still insufficient to deal with the 2013 floods in Kanyama, which were deemed a "disaster" by government officials, destroyed homes, blocked roads for transportation, and disrupted vital services like electricity.

The frequency and severity of floods in Kanyama greatly increased between 2016 and 2024. According to studies (Habanyama, et al., 2024; Banda and Musonda, 2023), over 70% of households experienced frequent flooding, which was associated with contaminated water, property damage, and epidemics of waterborne illnesses such diarrhoea and cholera. In response, both governmental and non-governmental organizations put measures into place, such as enhancing drainage networks, growing sewer systems, and supporting community resilience projects. In 2025, initiatives to strengthen urban resilience became more well-known. The €130

million sewer and sanitation development project initiated by the Lusaka Water and Sanitation Company would assist more than 1.2 million people, including those in Kanyama (Zambia Monitor, 2024). Despite ongoing efforts to improve living conditions, many residents of Kanyama Compound continue to experience flooding as a regular part of daily life. Limited financial resources and rapid population growth have made it difficult for the community to keep pace with the challenges posed by recurring floods. As a result, households frequently face outbreaks of waterborne diseases such as cholera and diarrhoea, damage to homes, and poor sanitation conditions (Zimba, 2022; Phiri, 2018). Flooding also disrupts small businesses and informal livelihoods, affecting residents' ability to earn an income and meet basic household needs. These experiences are shaped by social challenges such as poverty, insecure land ownership, and limited access to urban services, as well as physical conditions including low-lying terrain, poorly functioning drainage systems, and settlement expansion into wetland areas.

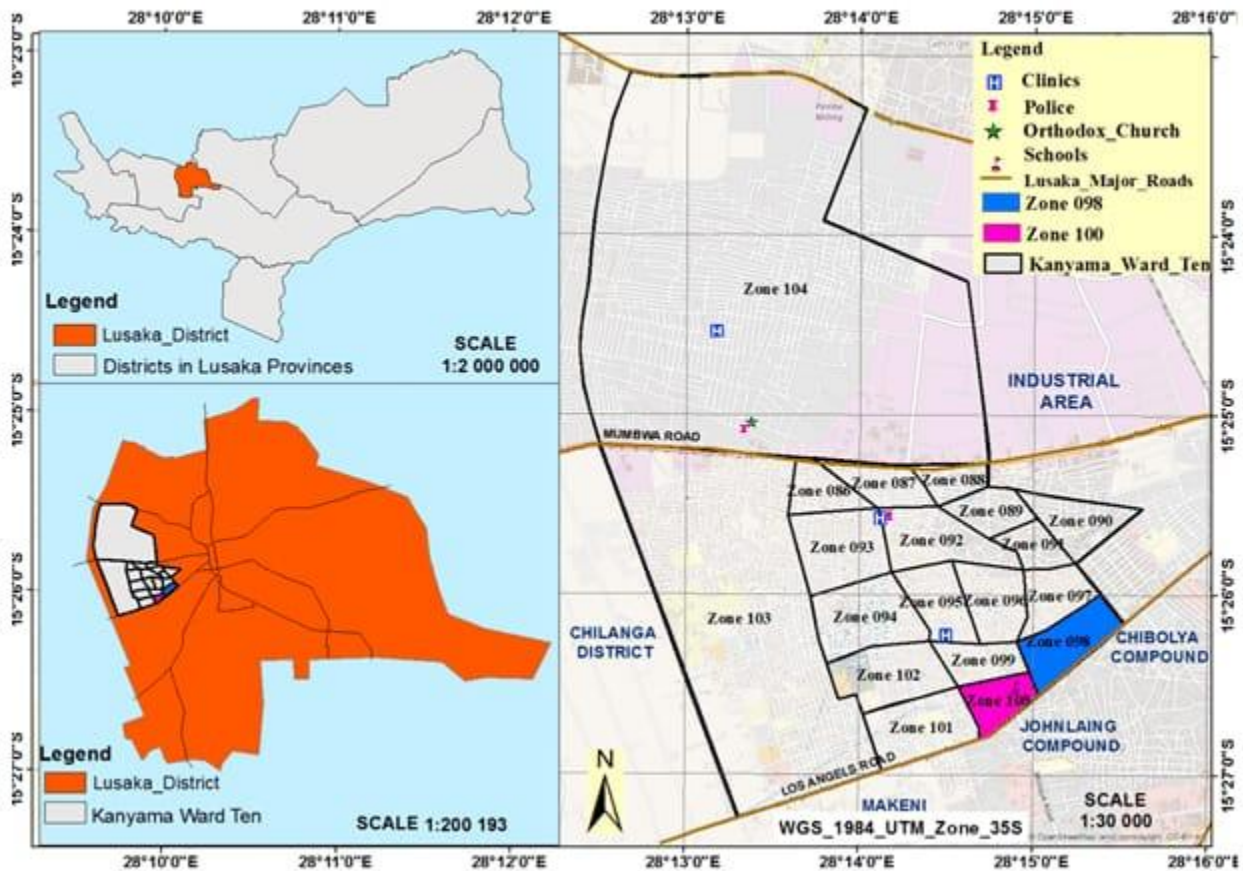
To cope with these repeated flood events, residents of Kanyama Compound have developed various community-based resilience strategies aimed at reducing damage and protecting their households. However, there is limited evidence on how effective these strategies are in practice. For example, drainage systems are often viewed as the first line of defence against flooding, yet little is known about how flooding affects their functionality and usefulness as a resilience strategy within the settlement. In addition, early flood warning information is shared through community leaders, neighbours, and informal communication channels, but the extent to which this information helps households prepare and respond effectively to floods remains unclear. Some households have also raised floor levels to prevent floodwater from entering their homes, though it is not well understood how effective this measure is in reducing flood-related damage.

The lack of clear, local-level evidence on these everyday resilience practices makes it difficult for communities and authorities to strengthen flood response efforts. Without understanding what works and what does not, interventions risk remaining short-term and insufficient. This study therefore seeks to examine the effects of floods on drainage systems as a community resilience strategy, assess the effects of disseminating early flood warning systems, and identify the effectiveness of raising floor levels in reducing flood impacts on households in Kanyama Compound, Lusaka.

Furthermore, Kanyama Compound is arguably one of the largest and most dynamic unplanned settlements in Lusaka (Daka, 2016). It is located to the west of Lusaka’s Central Business District and bordered by Los Angeles Road to the west and Mumbwa Road to the east (Lusaka City Council, 2021).

Figure: 1

Source: (Kameya et al, 2018)



1.3 Statement of the Problem

Kanyama Compound remained one of the most flood-prone unplanned settlements in Lusaka, experiencing recurrent flooding during almost every rainy season (Chisola and Bwalya, 2020). Despite repeated government interventions and community-level mitigation efforts, flood impacts persist and, in some instances, appear to be intensifying. Seasonal flooding continues to

result in destruction of property, displacement of households, disruption of livelihoods, and increased exposure to water-borne diseases (Habanyama et al., 2024). The recurrence of these impacts suggests that existing resilience measures may be inadequate, ineffective, or poorly coordinated.

The structural and environmental conditions of Kanyama Compound including its low-lying topography, high population density, inadequate drainage infrastructure, and unplanned housing development significantly heighten household vulnerability to flooding (Phiri, 2015). Reports from the Disaster Management and Mitigation Unit (DMMU, 2022) indicate that seasonal flooding in Lusaka's unplanned settlements affects thousands of households annually, leading to recurring humanitarian crises and public health challenges. Similarly, the Zambia Environmental Management Agency (ZEMA, 2021) attributes the persistence of flooding in Kanyama to blocked and poorly maintained drainage systems, ineffective solid waste management, and environmental degradation. Data from the Central Statistical Office (CSO, 2022) further reveal that a substantial proportion of households live in informal structures with limited access to sanitation and drainage facilities, thereby increasing their exposure to flood risks.

While several community and household-level coping strategies have emerged including reliance on drainage systems, dissemination of early flood warning information, and raising floor levels there is limited empirical evidence assessing the actual effectiveness of these resilience measures in reducing flood impacts. Existing drainage channels frequently overflow due to blockages and inadequate maintenance, yet their functional capacity as a resilience mechanism remains insufficiently examined. Early flood warning information is disseminated through ward development committees, churches, and informal networks, however, many households reportedly receive warnings after flooding has already begun, raising critical questions about timeliness, accessibility, and reliability. Similarly, although some households have raised floor levels to prevent water entry, financial constraints limit full structural adaptation, and the extent to which this measure meaningfully reduces flood damage remains unclear. The absence of localized, evidence-based evaluation of these specific resilience strategies creates a critical policy and planning gap. Without understanding whether drainage systems, early warning dissemination, and raised floor levels are effectively reducing flood impacts, policymakers, humanitarian agencies, and local stakeholders risk investing in interventions that provide only

partial or temporary relief. Consequently, there is an urgent need to systematically investigate the effectiveness of these resilience strategies in mitigating the effects of floods on households in Kanyama Compound. This study therefore seeks to assess the role and effectiveness of drainage systems, evaluate the dissemination and impact of early flood warning systems, and examine the extent to which raising floor levels reduces flood-related damage and livelihood disruption in Kanyama Compound, Lusaka

1.4 General objectives

To investigate the effects of floods on community resilience strategies in unplanned settlements, a case study of Kanyama Compound, Lusaka.

1.5 Specific Objectives

- i) To examine how flood events affect the functionality and sustainability resilience strategy of drainage systems as a community resilience strategy in Kanyama Compound, Lusaka.
- ii) To assess the effects of early flood warning dissemination on household preparedness and response in Kanyama Compound, Lusaka.
- iii) To identify the effectiveness of raising floor levels in reducing household vulnerability to flood damage in Kanyama Compound, Lusaka.

1.6 Research Questions

- i) In what ways do recurrent flood events influence the performance and maintenance of drainage systems in Kanyama Compound, Lusaka?
- ii) To what extent does early flood warning dissemination improve household preparedness and response to flooding in Kanyama Compound, Lusaka?
- iii) How does raising floor levels contribute to reducing household exposure and damage during flood events in Kanyama Compound, Lusaka?

1.7 Significance of the Study

Practical Implications for Local Communities: By examining the effects of floods on drainage systems, the study can guide residents and community leaders on maintaining and improving drainage infrastructure to minimize flood damage (Chisola and Bwalya, 2020; Simatele and Simatele, 2015).

Informing Early Warning Systems: By assessing the effects of disseminating early flood warning systems, the study highlights the importance of timely information in enabling households to prepare and respond effectively, reducing loss of property and risk to life (Phiri, 2015; Phiri, 2018; Habanyama et al., 2024).

Infrastructure and Planning Guidance: By identifying the effectiveness of raising floor levels in reducing flood impacts on households, the research provides evidence-based recommendations for flood-resistant housing and settlement planning (Zuria et al., 2018; Zimba, 2022).

Policy and Decision-Making: The findings can inform local authorities, disaster management agencies, and NGOs in designing targeted interventions, flood mitigation strategies, and community resilience programs tailored to high-risk areas like Kanyama Compound (Habanyama et al., 2024; Simatele and Simatele, 2015).

Academic Contribution: The study adds to the body of knowledge on urban flooding in unplanned settlements, particularly in Lusaka, addressing gaps in research on community-level resilience strategies and the effectiveness of infrastructural and early warning interventions (Chisola & Bwalya, 2020; Phiri, 2015; Zuria et al., 2018).

1.8 Scope of the Study

The goal of this study was to understand how flooding affected community resilience in Kanyama

The goal of this study was to understand how flooding affected community resilience in Kanyama Compound. Specifically, the study examined three key aspects of resilience strategies: the effects of floods on local drainage systems, the role of disseminating early flood warnings, and the effectiveness of raising household floor levels in reducing flood impacts. By focusing on these strategies, the study explored how households and communities withstand, adapt to, and recover from recurrent flooding. The research also considered the broader impacts of floods on residents' daily lives, health, housing stability, and emotional well-being, highlighting not only the physical but also the social and psychological dimensions of flooding (Simatele and Simatele, 2015).

The scope of the study included selected high-risk areas within Kanyama Compound, particularly low-lying informal extensions and areas near major drainage channels that have historically experienced severe flooding. The study period covered the years from 2015 to 2024, capturing both recent flood events and evolving community responses. Priority was given to

human experiences, household-level coping mechanisms, and community-level resilience strategies rather than engineering or hydrological assessments (Habanyama et al., 2024)

1.9 Delimitations of the Study

The study engaged local stakeholders, residents, and community leaders who had first-hand experience with flooding in Kanyama Compound. Data were collected through surveys, in-person community observations, and interviews. While the study did not focus on technical aspects such as soil analysis, large-scale hydrological mapping, or flood modelling, it emphasized human experiences, social systems, and community-driven responses (Phiri, 2015). Specifically, the study aimed to examine the effects of floods on drainage systems as a community resilience strategy, assess the effects of disseminating early flood warnings preparedness, and identify the effectiveness of raising floor levels in reducing the effects of floods on households.

1.10 Limitations of the Study

While the study provided valuable insights into community responses to flooding in Kanyama Compound, several limitations should be noted. First, the study focused primarily on the social and household aspects of flooding, examining drainage systems as a community resilience strategy, early flood warning dissemination, and the effectiveness of raising floor levels. As such, it did not include technical analyses such as soil testing, large-scale hydrological mapping, or detailed flood modelling, which could have provided additional scientific context to the findings. Second, the data collection relied on surveys, interviews, and in-person observations, which were limited to the perspectives of local stakeholders, residents, and community leaders. This approach may have excluded the experiences of residents who were unavailable or unwilling to participate, potentially affecting the generalizability of the results.

Finally, the study concentrated on the effects of specific resilience strategies at the household and community level, without examining broader infrastructural, governmental, or policy-level interventions that may also influence flooding outcomes. Consequently, the findings should be interpreted within the context of these community-driven responses and may not fully represent larger-scale flood management practices.

1.11 Definition of Key Terms and Concepts

Effects of Floods: The impact of floods on people, property, and the environment (Adelekan, 2011). In Kanyama, low-lying homes and poor drainage often lead to water entering streets and houses, damaging property, and disrupting daily life.

Unplanned Settlements: Areas where homes are built without formal planning or infrastructure (UN-Habitat, 2020). Kanyama is an informal settlement with weak infrastructure, which makes residents more vulnerable to floods.

Community Resilience: A community's ability to prepare for, respond to, and recover from disasters (Norris et al., 2008). In Kanyama, residents show resilience by supporting each other, maintaining drainage, and taking actions to reduce flood impacts (Creswell, 2024).

Household Flood Response Measures: Short-term actions households take to reduce flood damage (Berkes and Ross, 2013). In Kanyama, this includes raising furniture, moving items to safer areas, or temporarily relocating. These measures are part of evaluating the effectiveness of raised floor levels and early warning responses (Saunders et al., 2019).

Vulnerability: The extent to which people or households are exposed to flood risks and cannot cope, often due to poverty, poor housing, or limited support (Cutter et al., 2003).

Livelihoods: The ways residents earn a living, including small businesses and informal trade, which floods frequently disrupt (Chisola and Bwalya, 2020).

Drainage Systems: Channels or paths that remove excess water to prevent flooding. Proper drainage helps households and communities cope better with floods (Bryman, 2015).

Dissemination: The act of sharing information widely. In this study, it refers to spreading early flood warnings to residents to help them prepare (Creswell, 2024).

Early Flood Warnings: Alerts given before floods happen, allowing residents to take action like moving property or relocating temporarily (Saunders et al., 2019).

Effectiveness of Raising Floor Levels: How well elevating floors, furniture, or living areas above flood levels protects households from flood damage (Bryman, 2015).

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The literature on how floods affect community resilience strategies in unplanned areas like Kanyama Compound is thoroughly evaluated in this chapter. There are four primary sections to the review, the empirical review objective one will consist of (Global, Regional, and Local), moving on objective two, will consist of (Global, Regional and Local) and lastly objective three, will as well consist of (Global, Regional and Local), then secondly, the empirical review will contain theoretical framework (Disaster Risk Reduction and Urban Resilience Theory), thirdly, conceptual framework, and lastly, gaps in literature. The empirical review, which also draws on scholarly publications, worldwide reports, and regional studies, is based on the three specific study objectives. This literature identifies gaps that support the current research and helps establish what is currently known about floods in unplanned settlements.

2.2 Empirical Review

The authors and years of study are mentioned in the empirical review synthesis, which discusses other people's work. It offers proof of how floods impact coping mechanisms in unplanned communities like Kanyama Compound. This comparison approach makes it easier to spot trends, distinctions, and areas that require more investigation.

2.3 Objective One: Effects of Floods on the Functionality and Sustainability of Drainage Systems as a Community Resilience Strategy

2.3.1 Global Perspectives

Globally, drainage systems in informal settlements play a pivotal role in mitigating the impacts of floods. In Mumbai, India, inadequate maintenance of drainage channels disrupted water flow, exacerbating property damage and reducing household income-generating capacity (Parikh et al.,

2012). In Jakarta, Indonesia, low-lying districts experienced recurrent flooding due to blocked or poorly maintained drains, affecting over 60% of informal homes (World Bank, 2022).

Critically, these studies highlight that the mere presence of drainage infrastructure is insufficient. The effectiveness of drainage systems is contingent on routine maintenance, community engagement, and integration into urban planning frameworks. Evidence from Bangladesh's slum settlements further demonstrates that clogged drains contribute to prolonged waterlogging, causing property loss and daily life disruptions (Hug and Ayers, 2008). Therefore, drainage systems must be functional and sustainably managed to enhance community resilience to flooding.

2.3.2 Regional Perspectives (Africa)

African urban centers face similar challenges. In Accra, Ghana, poorly constructed drains led to repeated flooding in low-lying homes, prompting residents to elevate foundations as a coping mechanism (Mubanga, 2012). In Dar es Salaam, Tanzania, weak drainage infrastructure resulted in street and home water accumulation, undermining local coping strategies (Chileshe, 2020).

Temporary household drainage interventions, such as channels dug in Nairobi's Mathare and Kampala, Uganda, provide only short-term relief during heavy rainfall events (Semakula and Sserwanga, 2012; Adelekan, 2011). These findings underscore the limitations of reactive solutions and highlight the importance of structured, community inclusive drainage planning to sustain household resilience.

2.3.3 Local Perspectives (Zambia)

In Kanyama Compound, Lusaka, recurrent flooding is exacerbated by poorly maintained drains and the area's low-lying topography (Chisola and Bwalya, 2020; Simatele and Simatele, 2015). Residents attempt temporary solutions such as clearing drains or constructing makeshift channels (Habanyama et al., 2024), yet these are insufficient for long-term resilience. The persistence of floods indicates that formal drainage planning, routine maintenance, and integration with urban infrastructure are essential for enhancing community level adaptive capacity.

2.4 Objective Two: Effects of Early Flood Warning Dissemination on Household Preparedness and Response

2.4.1 Global Perspectives

Early flood warnings are recognized globally as a key strategy for enhancing household preparedness. In Thailand, community-led early warning systems enabled timely evacuation and property protection, reducing flood-related losses (UNDRR, 2015). In India, localized warning systems prompted residents to protect belongings and clean drainage channels (Sharma, 2010).

The effectiveness of early warning systems depends not only on the dissemination of alerts but also on local participation, accessibility of information, and integration with formal disaster management mechanisms. Studies indicate that without community engagement, early warnings may have limited impact on reducing vulnerability (Porio, 2014).

2.4.2 Regional Perspectives (Africa)

In Nigeria, neighborhood alert systems allow residents to safeguard property and prepare for floods, demonstrating the value of localized dissemination (Adelekan, 2011). Similarly, in Uganda, early warnings through community leaders support small businesses and households in implementing preventive measures (ADB, 2018).

However, the effectiveness of such interventions is constrained by limited resources and inconsistent communication channels, as observed in Kenya (Ssemakula and Sserwanga, 2012). This indicates that while community-based early warning systems improve preparedness, their success is contingent on the presence of robust institutional support and resource allocation.

2.4.3 Local Perspectives (Zambia)

In Kanyama, Lusaka, ward committees, churches, and community leaders disseminate early flood warnings, enabling households to temporarily relocate belongings or move to safer areas (Chisola and Bwalya, 2020; Simatele and Simatele, 2015; Habanyama et al., 2024). Although informal networks enhance preparedness, coverage gaps and lack of technical resources limit

their effectiveness in preventing property damage, emphasizing the need for structured, well-resourced early warning mechanisms.

2.5 Objective Three: Effectiveness of Raising Floor Levels in Reducing Household Vulnerability to Flood Damage

2.5.1 Global Perspectives

Raising household floors is a widely used short-term flood mitigation strategy. In Bangladesh and the Philippines, families elevated floors and used platforms to protect household assets during floods (UNICEF, 2019; Hug and Ayers, 2008). In Brazilian favelas, residents temporarily relocated or raised furniture to reduce damage (Maricato, 2011).

These measures are effective for immediate protection; however, repeated flooding events can overwhelm household adaptations, demonstrating that floor elevation alone is insufficient for long-term resilience (Jha et al., 2008). Integration with broader structural interventions and community-level strategies is therefore essential.

2.5.2 Regional Perspectives (Africa)

In Accra, Ghana, and Dar es Salaam, Tanzania, low-lying households have implemented raised foundations and elevated platforms to protect property during floods (Mubanga, 2012; Chileshe, 2020). While these adaptations reduce short-term damage, frequent flooding events limit their long-term efficacy, highlighting the need to combine household-level measures with sustainable drainage and urban planning initiatives.

2.5.3 Local Perspectives (Zambia)

In Kanyama Compound, residents raise floors, place furniture on elevated platforms, and relocate belongings to higher ground during floods (Chisola and Bwalya, 2020; Simatele and Simatele, 2015; Habanyama et al., 2024). While these interventions reduce immediate property damage, frequent floods indicate that household strategies must be complemented by systematic urban planning, functional drainage infrastructure, and community-level resilience measures for lasting protection.

2.6 Theoretical Framework

Understanding how floods affect community resilience strategies in unplanned settlements like Kanyama Compound is central to this study. The analysis is guided by two theoretical frameworks: Urban Resilience Theory (Meerow et al., 2016) and Disaster Risk Reduction (DRR) (UNDRR, 2015). These frameworks provide a foundation for assessing the effects of flooding on household-level resilience strategies, examining the role of community structures in strengthening resilience, and analysing how flooding affects residents' movement to places of work in Kanyama Compound, Lusaka.

2.6.1 Urban Resilience Theory

Urban Resilience Theory focuses on the capacity of urban systems social, economic, and physical to absorb shocks, adapt to stress, and recover from disasters (Folke et al., 2010; Meerow et al., 2016). In the context of Kanyama Compound, this theory helps to understand how flooding challenges household and community resilience.

Urban Resilience Theory suggests that poorly functioning drainage systems reduce a community's ability to absorb flood impacts. In Kanyama, blocked or inadequate drains exacerbate flooding, damage homes, and disrupt livelihoods (Chisola and Bwalya, 2020). Globally and regionally, studies in Mumbai, Jakarta, and Accra show that planned drainage systems improve community resilience by preventing waterlogging and allowing households to continue daily activities despite heavy rainfall (Parikh et al., 2012; World Bank, 2022; Mubanga, 2012).

The theory also explains that urban community's ability to adapt to hazards depends on timely information and coordinated responses. Early warning systems empower households to take pre-emptive measures such as moving property, sealing floors, or temporarily relocating (UNDRR, 2015). In Kanyama, reliance on informal networks reflects partial adaptation, highlighting the role of community organization and communication in resilience (Habanyama et al., 2024).

At the household level, resilience includes the ability to implement protective adaptations. Urban Resilience Theory recognizes raising floors as a short-term coping strategy that allows

households to reduce property damage during floods (UNICEF, 2019). However, repeated flooding without supportive infrastructure reduces long-term resilience, showing the need for integrated strategies combining drainage improvement, early warnings, and household adaptations.

In summary, Urban Resilience Theory provides a framework for understanding how drainage systems, early warning dissemination, and raised floors interact to maintain community and household resilience during flood events.

2.6.2 Disaster Risk Reduction (DRR) Framework

The DRR Framework focuses on reducing disaster risks by addressing hazards, vulnerabilities, and exposure, while strengthening preparedness, mitigation, and long-term adaptation (UNDRR, 2015). It is particularly useful for unplanned settlements like Kanyama, where residents are highly vulnerable to flooding due to poverty, weak infrastructure, and informal housing (Wisner et al., 2004).

DRR emphasizes that hazards such as floods are more damaging when combined with inadequate infrastructure. Improving drainage systems reduces the exposure of households and communities to floodwaters, lessens property damage, and enhances long-term resilience (Artur and Hilhorst, 2012; Pelling, 2003). In Kanyama, the lack of planned drainage highlights the importance of strategic interventions in line with DRR principles.

Preparedness is a key component of DRR. Early warning systems allow communities to act before floods occur, reducing human and economic losses (UNDRR, 2015). Effective dissemination ensures households can take protective measures, such as securing belongings or relocating temporarily (Chisola and Bwalya, 2020). DRR also stresses that early warning effectiveness depends on coverage, communication channels, and community trust.

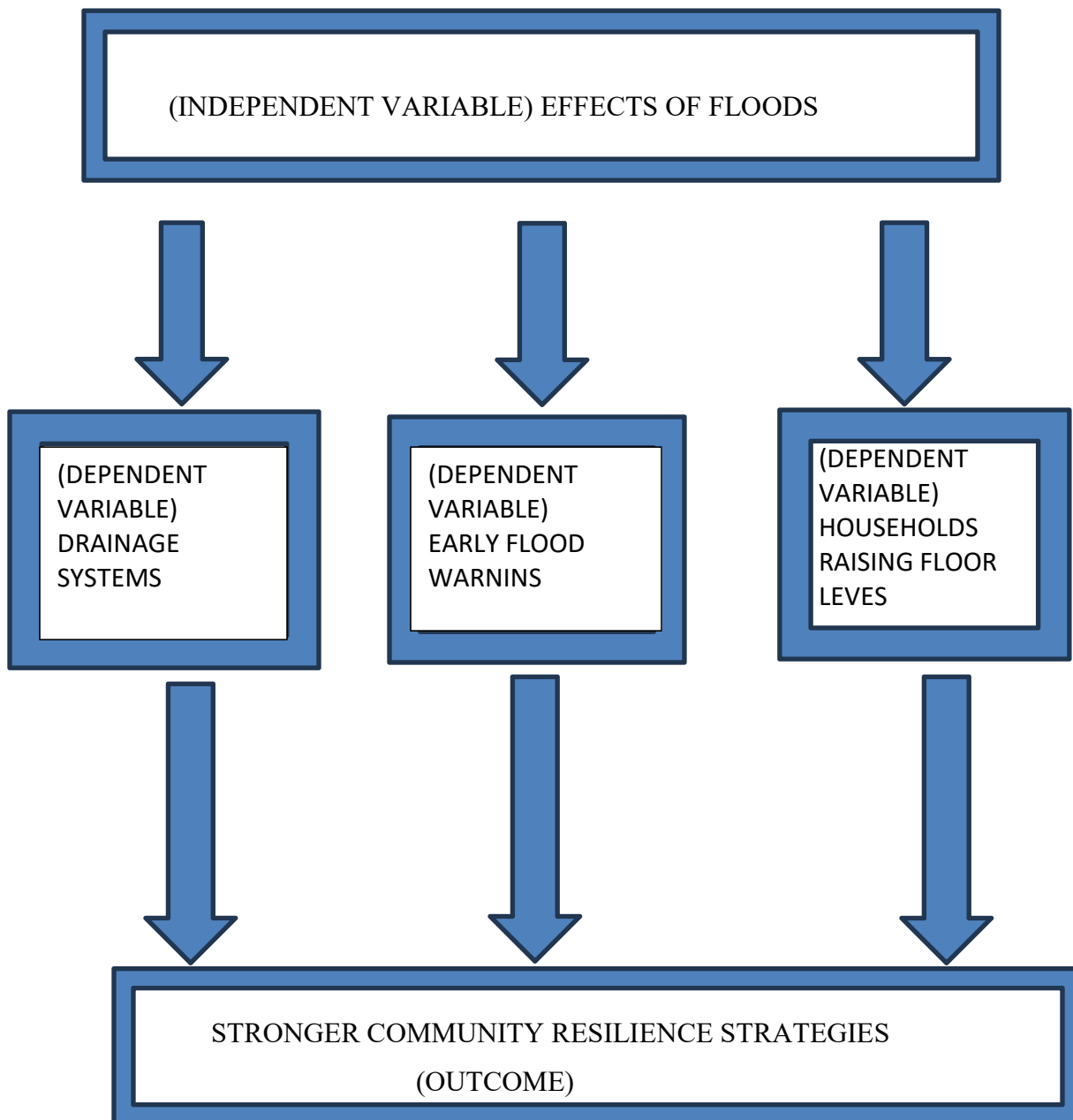
DRR promotes adaptive measures at the household level to reduce exposure to flood hazards. Raising floor levels, elevating furniture, or relocating household items are strategies that limit damage and maintain livelihoods during flooding (Hug and Ayers, 2008). The framework underscores that while such measures reduce immediate risk, combining them with structural

interventions like improved drainage and organized early warning systems creates long-term resilience.

Figure 2:

Source: Author, 2025

2.7 Conceptual Framework



The conceptual model above shows the factors contribute to the effect of floods in Kanyama Compound, Lusaka. The independent variable (IV) in this framework is the effect of floods, and the dependent variables (DV) which are; drainage systems, early flood warnings and households raising floor levels, therefore, the outcome is to have stronger community resilience strategies.

2.8 Gaps in Literature

- i. There is insufficient empirical evidence showing the actual effectiveness of drainage systems as a proactive community-level strategy, especially in informal settlements like Kanyama. (Phiri, 2015; Chisola and Bwalya, 2020) note that households often take short-term, reactive measures rather than benefiting from planned drainage systems.
- ii. There is a lack of research assessing how effective early flood warnings are in prompting households and communities to take protective actions, particularly in Kanyama-type settings. (Ssemakula and Sserwanga, 2012; Habanyama et al., 2024) highlight informal systems, gaps in coverage, and weak technical support.
- iii. There is insufficient research on how effective raising floor levels is as a sustained flood mitigation strategy in informal settlements, and whether it meaningfully contributes to long-term household and community resilience. (UNICEF, 2019; Habanyama et al., 2024) indicate that repeated flooding may still cause damage despite raised floors.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter outlined the research methodology and techniques used to investigate how flooding impacts community resilience strategies in unplanned communities using Kanyama Compound in Lusaka as a case study. The research design, study area, target population, sample size and sampling techniques, data collection tools, research instruments, data analysis methodology, ethical issues, and methodological limitations were all covered in this chapter. This approach was created to guarantee the gathering of accurate and trustworthy data required to achieve the following study objectives.

3.2 Research Design

The study adopted a mixed-methods research design (Creswell, 2014) to investigate flooding in Kanyama Compound and its impact on community resilience strategies. By combining quantitative and qualitative approaches, the study was able to capture both measurable trends and resident's lived experiences, providing a holistic understanding of flooding impacts.

Quantitative data enabled the assessment of patterns related to household-level strategies, such as the prevalence and effectiveness of drainage systems, early flood warnings, and floor-raising measures. Qualitative data, gathered through interviews, focus group discussions, and community observations, allowed the researcher to explore residents' perspectives, local practices, and community-led responses.

3.3 Study Area

The investigation was carried out in Kanyama Compound, an unplanned settlement located in Lusaka District, Zambia. Kanyama is highly vulnerable to flooding due to its dense population, poor housing conditions, and inadequate drainage infrastructure (Simfukwe, 2020). The settlement has experienced rapid growth driven by rural-urban migration, proximity to employment opportunities, and the shortage of affordable housing in planned urban areas.

Kanyama was selected as the study area because its physical and social characteristics provide an appropriate setting for examining community-level flood resilience strategies. The presence of poorly maintained and frequently blocked drainage systems makes the area suitable for examining the effects of floods on drainage systems as a community resilience strategy.

Recurrent flooding events also necessitate the use of early flood warnings, often disseminated through informal community networks, allowing the study to assess the effects of disseminating early flood warnings on household preparedness.

Additionally, many households in Kanyama adopt floor-raising measures, such as elevating floors or placing household items on raised platforms, to reduce flood damage. This makes the settlement ideal for identifying the effectiveness of raising floor levels in reducing flood effects on households. Overall, Kanyama Compound offers a relevant and representative context for understanding how communities in unplanned settlements respond to and build resilience against flooding.

3.4 Target Population

The target audience included Kanyama Compound families, locals, local officials, and a few chosen representatives from WARMA, the Lusaka City Council, and the Disaster Management and Mitigation Unit (DMMU). As of 2024, Kanyama's estimated population was 525,902, according to Central Statistical Office (CSO) (World Bank, 2024). The study focused on individuals who had experienced flooding and could provide insights on the effectiveness of community resilience strategies.

3.5 Data Collection Tools

3.5.1 Questionnaires

A questionnaire is a type of research instrument that consists of a set of questions intended to consistently gather responses from study participants. According to (Creswell, 2012), a questionnaire is a type of survey design that participants fill out and return to the researcher. They could be unstructured, semi-structured, or structured. In order to collect accurate data in a methodical manner, the researcher used a semi-structured questionnaire in this study. It also allowed the researcher to gather both quantitative and qualitative information from Kanyama Compound residents about the effects of floods on drainage systems as a community resilience strategy, assessing the effects of disseminating early flood warnings and identifying the effectiveness of raising floor levels in reducing flood effects on households.

3.5.2 Interview Guide

Interviews are a popular technique for gathering qualitative data (Ary, 2010). It is used to find out what people think, feel, and say about a particular situation. The researcher used an open-ended interview method for this study so that Kanyama Compound residents may freely express their thoughts and decisions on the effects of flooding. Since open-ended interviews permit the respondent to discuss their encounter with specific scenarios without having to answer "yes" or "no," the researcher was able to understand the variety of experiences that the selected respondents had in this case without limiting their comments. Additionally, the researcher was able to learn more about the consequences of floods because to the open-ended interviews.

3.6 Sample Size and Sampling Techniques

3.6.1 Sample Size

Using (Taro Yamane, 1967) which calculate,

$$n = N/1+N(e)^2$$

n = sample size

$$N= 525, 902$$

e = margin of error

$$n = 525,902/1+525,902(0.1) ^2$$

$$n = 525,902/1+5,259.02$$

$$n = 525,902/5260.02$$

$$n = 100$$

Due to its qualitative, case study focus, this study used a sample size of 25 respondents even though (Tara Yamane's, 1967), formula would recommend a larger sample size for a population of 525,902. The study prioritized depth of understanding over statistical generalization by concentrating on rich, lived experiences of floods and community resilience in Kanyama Compound. According to (Creswell, 2014), qualitative case studies require smaller, carefully selected samples to allow for in-depth examination of social phenomena. Furthermore, according to (Guest et al., 2006), sample sizes of 20 to 30 people are often adequate to achieve data saturation in qualitative research. As a result, it was determined that a sample size of 25 would be sufficient to capture a variety of viewpoints while yet being manageable given the study's time and resource limitations.

3.6.2 Sampling Techniques

To identify key informants such as local government representatives, health authorities, and community leaders who were knowledgeable about flooding episodes and community resilience strategies purposive sampling was used. In addition, simple random sampling was employed to select household respondents in order to minimize bias and ensure that every household in the target population had an equal chance of being included in the study.

The sampled households provided information on specific resilience strategies, including the condition and use of drainage systems, access to and response to early flood warning mechanisms, and the adoption of raised floor levels as a flood mitigation measure. This combined sampling approach ensured that both informed perspectives from key stakeholders and representative community experiences were adequately captured.

3.7 Data Collection Methods

3.7.1 Primary Data

Primary data were collected through quantitative surveys and semi-structured interviews to generate both numerical data and in-depth qualitative insights from residents of the study area. The data focused on household-level community resilience strategies, the role of community structures, and the impact of flooding on access to health services. Specifically, the primary data examined the effects of floods on drainage systems as a community resilience strategy, assessed the effects of disseminating early flood warnings in enhancing household preparedness and response, and identified the effectiveness of raising floor levels in reducing the impacts of flooding on households. The combination of structured questionnaires and semi-structured interviews enabled the researcher to capture resident's lived experiences, perceptions, and practical coping mechanisms used before, during, and after flooding events.

3.7.2 Secondary Data

Secondary data were obtained from government reports, books, peer-reviewed journals, and publications from organizations such as the World Bank, UN-Habitat, and the Disaster Management and Mitigation Unit (DMMU). These sources provided background information on the nature and extent of flooding in Kanyama Compound and documented flood management experiences from other unplanned settlements.

Specifically, the secondary data were used to achieve the following objectives: to examine the effects of floods on drainage systems as a community resilience strategy; to assess the effects of

disseminating early flood warning information on household preparedness and response; and to identify the effectiveness of raising floor levels in reducing the impacts of floods on households. The reviewed literature also enabled the researcher to evaluate the effectiveness of these interventions as implemented in similar unplanned communities, thereby offering comparative insights and informing the analysis of resilience strategies adopted by households in Kanyama Compound.

3.8 Reliability and Validity of the Study

The study ensured reliability through the use of standardized data collection instruments that were administered uniformly to all respondents. A structured questionnaire and a semi-structured interview guide were employed to guarantee consistency in the data collected across households. Prior to the main data collection exercise, the instruments were pre-tested in a neighbouring unplanned settlement with similar characteristics to Kanyama Compound. This pre-testing process helped to identify ambiguities, refine question wording, and improve the clarity and applicability of the instruments.

To further enhance reliability and minimize interviewer bias, research assistants were adequately trained on the objectives of the study and on the consistent administration of the data collection instruments. This ensured that questions related to the examination of flood effects on drainage systems, the assessment of disseminated early flood warnings, and the identification of the effectiveness of raised floor levels were asked and interpreted in a uniform manner across all respondents.

Validity of the study was ensured by aligning the research instruments directly with the specific objectives of the study. Questions designed to address the first objective examined the effects of floods on drainage systems as a community resilience strategy, focusing on issues such as drainage blockages, maintenance practices, and their role in reducing flood impacts. Items linked to the second objective assessed the effects of disseminated early flood warning information on household preparedness, response, and risk reduction. For the third objective, questions explored the effectiveness of raising floor levels in reducing flood impacts on households, including protection of property and reduction in displacement during flood events.

Content validity was strengthened through an extensive review of relevant literature and policy documents from government institutions and development organizations, ensuring that the instruments adequately captured key dimensions of flood impacts and community resilience. In

addition, participant validation (member checking) was employed to enhance credibility, whereby respondents were given the opportunity to clarify and confirm the researcher's interpretations of their responses, ensuring that the findings accurately reflected residents' lived experiences, as supported by (Braun and Clarke, 2006).

3.9 Research Instruments

Both closed-ended and open-ended questions were used in the surveys to gather quantitative and qualitative data from the residents. Interview guidelines are used to hold in-depth discussions with key informants, including local politicians and community leaders, drainage systems, disseminating early flood warning, and effectiveness of raising floor levels in reducing flood effects on households were all visually assessed using observation checklists.

3.10 Data Analysis

Quantitative data were analyzed using descriptive statistics, including tables, percentages, and frequencies, with pie charts to visually illustrate trends and comparisons.

Qualitative data were analyzed using thematic analysis (Braun and Clarke, 2006) and aligned with the study objectives;

Familiarization, all responses were read multiple times to understand participants' experiences regarding flood events, drainage systems, early warnings, and mitigation measures in Kanyama Compound.

Generating codes, relevant data were labeled with codes such as blocked drains, damaged infrastructure, timely household preparation, and raised floor levels, corresponding to the three objectives.

Searching for themes, codes were grouped into themes:

Functionality and sustainability of drainage systems (Objective 1)

Household preparedness through early flood warning dissemination (Objective 2)

Effectiveness of raised floor levels in reducing household vulnerability (Objective 3)

Reviewing and defining themes, themes were refined to ensure accurate representation of participants' perspectives and direct alignment with objectives.

Reporting, final themes were presented with supporting quotes, and pie charts were used to highlight patterns and proportions of responses.

3.11 Ethical Considerations

This study adhered to standard ethical principles in social research. Participants provided informed consent after being fully briefed on the study's objectives, procedures, potential risks, and benefits. They were informed that participation was voluntary and that they could withdraw at any time without facing any repercussions. Anonymity and confidentiality were maintained throughout the research process, ensuring that participants' sensitive experiences with flooding were accurately documented and protected (Babbie, 2020).

Ethical approval for this study was obtained from the University of Lusaka Institutional Review Board, in line with the university's requirements for research involving human participants.

Inclusion criteria required participants to be residents of Kanyama Compound who had experienced flooding within the past five years and were aged 18 years or older. Individuals not meeting these criteria or unwilling to participate were excluded from the study. These measures ensured that the data collected were relevant, reliable, and ethically sound.

3.12 Limitations of the Methodology

- i) The limited sample size of 25 may not fully represent all experiences at Kanyama Compound, despite the fact that it allowed for in-depth qualitative insights.
- ii) Sampling bias may cause some points of view to be overrepresented when key informants are purposefully chosen.
- iii) Subjectivity in qualitative responses depended on individual experiences, which may be influenced by feelings or recollections.
- iv) Limited generalizability, results from Kanyama might not be applicable to other communities with distinct environmental or socioeconomic circumstances.
- v) Limited time and resources made it difficult to employ sophisticated technologies like GIS mapping or investigate seasonal patterns.
- vi) Also, the people of Kanyama may refuse to give data, due to nothing been done in their locality, despite, people asking questions and still no development.

Despite these drawbacks, the technique captured both the structural context of flooding in Kanyama and the lived experiences of residents, which was adequate to satisfy the three study objectives.

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter summary presents and analyses the results of the field data obtained in Kanyama Compound. Information was acquired from 25 respondents through interviews, and the results are presented using tables and narrative explanations in accordance with the questionnaire. The results are derived on both quantitative and qualitative data obtained using surveys and an interview guide. Thematic analysis was used to examine qualitative data, whereas descriptive statistics like percentages and frequencies were used to examine quantitative data. This method acknowledges that flooding is a lived experience influenced by poverty, unplanned housing, inadequate infrastructure, and close social ties, in addition to being a physical occurrence. The results are given in accordance with the objectives of the research. This approach recognises that flooding is not only a physical event but a lived experience shaped by poverty, unplanned settlements, limited infrastructure and strong social ties.

4.2. Data presentation

4.2.1 Demographic Characteristics of Respondents

These are simply features within a population of a locality, they are characterized by sex, gender, age, length of stay in that locality and occupation. Under this section, the researcher presents the demographic characteristics of the respondents who participated in this study as follows.

Table 1 **Sex of Respondents n = 25**

| Gender | Frequency | Percentage (%) |
|--------|-----------|----------------|
| Male | 11 | 44 |
| Female | 14 | 56 |
| Total | 25 | 100 |

Source: Author (2025)

Most respondents were female, showing that women were more available and willing to share their experiences. This reflects the reality that women are often the most affected by floods, as they manage household responsibilities.

Table 2 Age groups Respondent n = 25

| Age Group | Frequency | Percentages (%) |
|-----------|-----------|-----------------|
| 18-25 | 6 | 24 |
| 26-35 | 8 | 32 |
| 36-45 | 7 | 28 |
| 46-55 | 3 | 12 |
| 56+ | 1 | 4 |
| Total | 25 | 100 |

The majority of respondents were between 26-35, representing the most active working population, this age group is also highly affected by disaster because they are responsible for support families

Table 3 Length of Stay in Kanyama n = 25

| Length of Stay | Frequency | Percentages (%) |
|-----------------|-----------|-----------------|
| Less than 1year | 2 | 8 |
| 1-5years | 6 | 24 |
| 6-10 years | 9 | 36 |
| Over 10 years | 8 | 32 |
| Total | 25 | 100 |

Most respondents 68% had lived in Kanyama for more than 6 years, this long-time experience allowed them to provide deep, well-informed insights about recurring floods and coping strategies.

Table 4 Occupation of Respondents n = 25

| Occupation | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| Employed | 7 | 28 |
| Self-employed | 10 | 40 |
| Unemployed | 5 | 20 |

| | | |
|---------|----|-----|
| Student | 2 | 8 |
| Other | 1 | 4 |
| Total | 25 | 100 |

Most respondents were self-employed 40% reflecting the informal nature of Kanyama’s economy, the unemployed group 20% also highlighted high economic vulnerability, which worsens the impact of floods.

4.3 Presentations of Findings

The findings are based on data collected from household respondents in Kanyama Compound. The presentation follows the structure of the questionnaire and interview guide is organized according to the study objectives, namely, examining the effects of floods on drainage systems as a community resilience strategy, assessing the effects of disseminated early flood warnings, and identifying the effectiveness of raising floor levels in reducing flood effects on households. The findings are presented descriptively to reflect respondent’s experiences and perceptions.

It further, established that respondents were drawn from diverse demographic backgrounds. Both male and female residents participated in the study, ensuring gender representation. Most respondents fell within the economically active age groups, indicating that flooding directly affects productive household members. The findings further revealed that a large proportion of respondents had lived in Kanyama Compound for more than five years, suggesting that they had adequate experience with recurring flood events. In terms of occupation, most respondents were engaged in informal economic activities and casual labour, highlighting the vulnerability of livelihoods to flood disruptions.

4.3.1 Effects of Floods on Drainage Systems as a Community Resilience Strategy

The findings revealed that drainage systems in Kanyama Compound were generally inadequate and poorly maintained. *Respondents aged 18-25 “described drainage channels as narrow, shallow, and frequently blocked by solid waste”*, which limited their capacity to manage heavy rainfall. Flooding was reported to worsen the condition of drainage systems by causing siltation, collapse of channels, and overflow of stagnant water into residential areas.

Despite these challenges, community participation in drainage maintenance was evident. Respondents indicated that residents occasionally engaged in collective cleaning of drainage channels, particularly before and during the rainy season. However, these efforts were described as irregular and insufficient due to limited resources and lack of technical support. As a result, drainage systems were perceived as only moderately effective in reducing flood impacts at the household level.

Overall, the findings suggest that while drainage systems remain a key community resilience strategy, their effectiveness is constrained by poor infrastructure, rapid population growth, and inadequate waste management practices.

Table 5 Condition of Drainage Systems and Flood Effect n =25

| Drainage Condition | High Effect | Flood | Moderate Effect | Low Effect | Total |
|--------------------|-------------|-------|-----------------|------------|-------|
| Poor/Blocked | 9 | 4 | 0 | 13 | |
| Fair | 3 | 3 | 1 | 7 | |
| Good | 1 | 2 | 2 | 5 | |
| Total | 13 | 9 | 3 | 25 | |

52% (13 respondents), reported that drainage systems are poor or blocked, furthermore, the 9 experienced high flood effect, and lastly, 20% reported good drainage, and these households experienced relatively lower flood severity.

4.3.2 Effects of Disseminated Early Flood Warnings

The study found that early flood warning information was available to some residents, although access was uneven across the community. *Respondents aged 26-35 reported “receiving flood warnings mainly through informal channels such as community leaders, neighbours, and radio broadcasts, Mobile phone-based warnings were less common.*

Respondents aged 36-45, “indicated that warnings enabled them to take precautionary measures such as moving household items to safer places, reinforcing house structures, or temporarily relocating vulnerable family members”. However, respondents aged 46-55 “reported that warnings were often received too late to allow meaningful preparation”.

The effectiveness of early flood warnings in reducing flood impacts was therefore perceived as limited. Challenges affecting dissemination and use of flood warnings included lack of timely information, poor communication systems, and low trust in warning accuracy. These findings indicate that while early flood warnings have the potential to enhance preparedness, their impact in Kanyama Compound remains constrained by systemic and communication barriers.

Table 6 Early Warning and Preparedness Level n = 25

| Received Early Warning | High Preparedness | Moderate | Low | Total |
|------------------------|-------------------|----------|-----|-------|
| Yes (15) | 6 | 7 | 2 | 15 |
| No (10) | 1 | 3 | 6 | 10 |
| Total | 7 | 10 | 8 | 25 |

60% received early warning, among those who received warning, most demonstrated moderate to high preparedness, and those who did not receive warning, 60% reported low preparedness.

4.3.3 Effectiveness of Raising Floor Levels in Reducing Flood Effects on Households

The findings revealed that some households had adopted the practice of raising floor levels as a coping strategy against flooding. Decisions to raise floor levels were largely influenced by repeated flood experiences and the desire to protect property and household members.

Respondents aged 56 and above had raised floor levels reported “noticeable reductions in flood-related damage, particularly with regard to water entering living spaces and destruction of household goods”. Raised floors were perceived as effective in minimizing the immediate impacts of floods compared to households without such adaptations.

However, the study also identified several challenges associated with raising floor levels. High construction costs, lack of building materials, limited space, and absence of technical knowledge were commonly cited barriers. Despite these challenges, raising floor levels was generally viewed as an effective long-term household-level resilience strategy, especially when combined with other measures such as improved drainage and early warnings.

Table 7 Raised Floor Levels and Reported Flood Damage n = 25

| Raised Floor Level | High Damage | Moderate Damage | Low Damage | Total |
|--------------------|-------------|-----------------|------------|-------|
|--------------------|-------------|-----------------|------------|-------|

| | | | | |
|----------|----|---|---|----|
| Yes (12) | 2 | 5 | 5 | 12 |
| No (13) | 8 | 4 | 1 | 13 |
| Total | 10 | 9 | 6 | 25 |

48% raised floor levels, and those who raised floors, only 2 experienced high damage, and those who did not raise floors, 8 experienced high damage.

4.3.4 Comparative Effectiveness of Flood Resilience Strategies

When respondents compared drainage systems, early flood warnings, and raised floor levels, most perceived raised floor levels as the most effective strategy in reducing flood impacts at the household level. This was followed by drainage maintenance, while early flood warnings were considered supportive but less reliable on their own.

Respondents emphasized that no single strategy was sufficient in isolation. Instead, a combination of improved drainage infrastructure, timely flood warnings, and household-level structural adaptations was viewed as the most effective approach to reducing flood effects in Kanyama Compound.

4.4 Discussion of Findings

The study established that flooding in Kanyama Compound continues to pose significant challenges to households due to inadequate drainage systems, limited effectiveness of early flood warnings, and structural vulnerabilities of housing. While community and household resilience strategies exist, their effectiveness is constrained by socio-economic and infrastructural limitations. Nonetheless, raised floor levels emerged as a relatively effective coping strategy, particularly when complemented by community-based and institutional interventions.

This section discusses the study findings in relation to the study objectives and highlights the implications of these findings for community resilience, policy, and household-level flood management in Kanyama Compound.

Effects of Floods on Drainage Systems as a Community Resilience Strategy

The findings revealed that drainage systems in Kanyama Compound are largely inadequate, poorly maintained, and frequently blocked, limiting their capacity to reduce flood impacts.

Although community members participate in drainage cleaning activities, these efforts are irregular and constrained by limited resources and lack of technical support. This suggests that drainage systems, while central to community resilience, are currently insufficient as a standalone strategy for managing floods.

The implication of this finding is that reliance on informal community-led drainage maintenance without institutional support is unlikely to significantly reduce flood risks. For community resilience to be strengthened, drainage systems must be improved structurally and supported by local authorities through regular maintenance, proper waste management, and enforcement of urban planning regulations. This directly addresses the first objective by demonstrating that effective drainage systems are critical but require coordinated action to function as a reliable resilience strategy.

Effects of Disseminated Early Flood Warnings

The study found that early flood warnings are disseminated through informal and semi-formal channels such as community leaders, radio broadcasts, and neighbours. While some households benefited from these warnings by taking precautionary actions, the overall effectiveness of early flood warnings was limited due to delays, poor coverage, and lack of reliable communication systems.

These findings imply that early flood warnings, in their current form, have limited impact on reducing flood damage and household vulnerability. For early warning systems to effectively support community resilience, they must be timely, reliable, and accessible to all residents. Strengthening communication infrastructure and formalizing warning dissemination mechanisms would enhance household preparedness and reduce losses. This fulfils the second objective by showing that early flood warnings are important but insufficient unless systematically improved.

Effectiveness of Raising Floor Levels in Reducing Flood Effects on Households

The findings indicated that raising floor levels is an effective household-level adaptation strategy, particularly in reducing water entry into homes and minimizing damage to property. Households that adopted this strategy reported improved protection during flood events compared to those that did not. However, adoption was limited by high costs, lack of materials, space constraints, and insufficient technical knowledge.

The implication of this finding is that structural household adaptations play a crucial role in reducing flood impacts, especially in unplanned settlements where large-scale infrastructure is lacking. However, without financial and technical support, many vulnerable households are unable to adopt this effective strategy. Supporting affordable and safe housing adaptations would significantly enhance household resilience. This directly addresses the third objective by demonstrating that raised floor levels are effective but require support for wider adoption.

Implications for Community Flood Resilience

Taken together, the findings imply that flood resilience in Kanyama Compound cannot be achieved through a single intervention. Drainage systems, early flood warnings, and raised floor levels are interconnected strategies that must be implemented in a complementary manner. The study highlights the need for integrated flood management approaches that combine community participation, institutional support, and household-level adaptations.

CHAPTER FIVE SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter investigated the effects of flooding in unplanned settlements like Kanyama Compound, poses significant challenges to the livelihoods, health, and well-being of residents. This study aimed to investigate the effects of floods on households in Kanyama, with a focus on understanding both community-level and household-level resilience strategies. Using a combination of quantitative data from household questionnaires and qualitative insights from interviews, the study examined how residents cope with flooding, the effectiveness of existing flood mitigation measures, and the barriers limiting their success. The following sections summarize the main findings, draw conclusions, and provide practical recommendations to enhance flood resilience in the community.

5.1 Summary of Findings

The study found that flooding remains a persistent problem in Kanyama Compound, driven primarily by inadequate and poorly maintained drainage systems. Drainage channels were narrow, shallow, and frequently blocked by solid waste, reducing their effectiveness during heavy rainfall. Although residents participate in community drainage maintenance, these efforts are irregular and constrained by limited resources and a lack of technical support.

The study also revealed that early flood warnings are disseminated mainly through informal channels such as community leaders, neighbours, and radio broadcasts. While some households benefited from early warnings by taking precautionary measures, the overall effectiveness of these warnings was limited due to delays, poor coverage, and low trust in the accuracy of the information.

Raising floor levels emerged as a key household-level coping strategy. Households that had implemented this adaptation reported reduced water entry and less damage to household property. However, high construction costs, lack of materials, limited space, and insufficient technical knowledge restricted widespread adoption.

Overall, the findings indicate that no single resilience strategy is sufficient on its own. Enhancing flood resilience in Kanyama requires an integrated approach combining improved drainage systems, effective early warning mechanisms, and household-level structural adaptations.

5.2 Conclusion

Flooding in Kanyama Compound continues to adversely affect households due to infrastructural deficiencies, limited early warning effectiveness, and structural vulnerabilities of housing. Although community-level and household-level resilience strategies exist, their impact is constrained by socio-economic challenges, inadequate institutional support, and rapid population growth.

Among the strategies examined, raising floor levels was the most effective household-level adaptation. However, its benefits are unevenly distributed due to financial and technical barriers. Drainage systems and early warning mechanisms, while important, require significant institutional strengthening to function effectively.

The study concludes that enhancing flood resilience in Kanyama Compound requires coordinated efforts between households, communities, and government institutions. Without integrated and sustained interventions, flooding will continue to undermine livelihoods, housing stability, and the overall well-being of residents.

5.3 Recommendations

5.3.1 Recommendations for Government and Local Authorities Conduct a Technical Drainage Audit Within 12 Months

The Lusaka City Council and relevant engineering departments should conduct a comprehensive technical assessment of existing drainage infrastructure in Kanyama to, identify undersized and collapsed drainage channels, map high-risk flood zones and determine redesign specifications based on rainfall intensity data. This audit should guide phased upgrading of drainage systems rather than ad hoc repairs.

Establish a Quarterly Drainage Maintenance Program

Instead of irregular cleaning, local authorities should institutionalize a quarterly maintenance schedule, particularly before and during the rainy season, like desilting and widening of drainage channels, clearing solid waste blockages and repair of damaged culverts. A dedicated budget line for drainage maintenance should be allocated within the municipal infrastructure plan.

Integrate Solid Waste Management with Flood Mitigation

Because blockage was identified as a key issue, the Council should increase waste collection frequency in flood-prone zones, provide additional communal waste bins, enforce penalties for

dumping waste into drainage systems and community-based waste monitors could be formally appointed and supported.

Develop a Structured Early Warning Communication System

Instead of relying mainly on word-of-mouth communication, authorities should partner with mobile network providers to implement SMS-based flood alerts, create a localized flood alert WhatsApp broadcast group managed by ward officials and install community notice boards displaying seasonal flood risk levels. This system should provide warnings at least 24-48 hours before anticipated heavy rainfall events.

5.3.2 Recommendations for Communities and Households

Residents should establish structured drainage committees responsible for monthly inspection of drainage channels, organizing community clean-up campaigns and reporting structural damage to local authorities and should work in collaboration with ward development committees.

Promote Low-Cost Floor Elevation Guidelines

Since raising floor levels was found to reduce flood damage, technical guidance should be developed to ensure safe construction practices, this may include minimum recommended elevation height (example 30–50 cm above ground level in high-risk zones) using of stabilized soil blocks or concrete reinforcement, to avoid structural weakening during elevation

Short training workshops can be conducted by local engineers or NGOs.

Household Flood Preparedness Plans

Each household should be encouraged to develop a simple preparedness checklist, including pre-identifying safe storage spaces, elevating furniture before rainy season, preparing emergency contact lists and community leaders should coordinate annual preparedness meetings before the onset of heavy rains.

5.3.3 Recommendations for Policy and Future Research

Integrate Household Adaptation into Urban Planning Policy

Urban planning policies should formally recognize and regulate incremental housing adaptations such as floor elevation to ensure structural safety, compliance with minimum standards and technical support for low-income households this prevents unsafe construction practices.

Establish Multi-Stakeholder Flood Resilience Platforms

Government agencies, community leaders, NGOs, and disaster management institutions should create a coordinated platform to share flood data, monitor implementation of mitigation

measures, evaluate preparedness effectiveness annually and improved institutional coordination can strengthen disaster risk reduction efforts.

Future Research Directions

Future studies should conduct cost-benefit analysis of drainage upgrading versus household-level adaptation, examine long-term sustainability of raised floor interventions, investigate governance and institutional bottlenecks affecting flood mitigation implementation and comparative research across other flood-prone settlements in Lusaka would also strengthen generalizability.

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APPENDIX 1



INTERVIEW GUIDE

My name is Mulenga Chola, a final year student at the University of Lusaka. I am conducting a study on the Effects of Floods on Community Resilience Strategies in Unplanned Settlements: A Case Study of Kanyama Compound. The information that will be collected is purely for academic purposes only in partial fulfillment of a Bachelor's degree in Development Studies. The information will be treated with confidentiality.

Section A: Respondent Background Information

1. Sex of respondent:

Male Female

2. Age group:

18–25 26–35 36–45 46 and above

3. How long have you lived in Kanyama Compound?

Less than 5 years

5–10 years

More than 10 years

4. What is your main occupation?

- Formal employment
- Informal business
- Casual labour
- Unemployed
- Other (specify)

Section B: Effects of Floods on Drainage Systems as a Community Resilience Strategy

5. would you describe the drainage systems in your area?
6. In what ways do floods affect drainage systems in Kanyama?
7. Are community members involved in cleaning or maintaining drainage channels? Please explain.
8. How effective are drainage systems in reducing flood impacts in your household?
9. What challenges limit the effectiveness of drainage systems as a flood resilience strategy?

Section C: Effects of Disseminated Early Flood Warnings

10. Do residents in this area receive early flood warning information?
11. What are the main channels used to disseminate flood warnings?
12. How do households respond after receiving early flood warnings?
13. In your view, how effective are early flood warnings in reducing flood impacts?
14. What challenges affect the dissemination or use of early flood warning information?

Section D: Effectiveness of Raising Floor Levels in Reducing Flood Effects on Households

15. Have households in this area raised floor levels to reduce flood impacts?
16. What reasons influenced the decision to raise floor levels?
17. How has raising floor levels helped reduce flood damage in households?
18. What challenges do households face when raising floor levels?
19. How effective is raising floor levels as a long-term flood resilience strategy?

Thank you for your cooperation

APPENDIX 2



UNIVERSITY OF LUSAKA

QUESTIONNAIRE ON THE EFFECTS OF FLOODS ON COMMUNITY RESILIENCE STRATEGIES IN UNPLANNED SETTLEMENTS: A CASE STUDY OF KANYAMA COMPOUND IN LUSAKA DISTRICT

Dear respondent,

My name is Mulenga Chola, I am final year student at the University of Lusaka pursuing a Bachelor's degree in Development studies. I am conducting a study on the effects of floods on community resilience strategies in unplanned settlement in Kanyama Compound in Lusaka District. I am pleased to inform you that you have been selected to participate in this study through answering semi-structured and structured questionnaires. Kindly note that this study is for academic purposes only and the information collected will be confidential. Furthermore, the information will not be reproduced or published in any other form.

Your cooperation will be highly appreciated.

INSTRUCTIONS

1. Do **NOT** indicate your personal details (name, phone number or home address) on the questionnaire.
2. This research is purely for academic purposes only.
3. Information obtained is highly confidential.
4. Please answer all the questions accordingly.

5. There are 21 questions that you are required to answer. There is no right or wrong answer because the questions are open ended and closed-ended.
6. Circle each of the answers that you have selected.

Section A: Demographic Characteristics of Respondents

1. Sex:
 Male Female
2. Age group:
 18–25 26–35 36–45 46 and above
3. Length of stay in Kanyama Compound:
 Less than 5 years
 5–10 years
 More than 10 years
4. Occupation of respondent:
 Formal employment
 Informal trading/business
 Casual labour
 Unemployed
 Other (specify)

Section B: Effects of Floods on Drainage Systems

5. Does your area experience flooding during the rainy season?
 Yes No
6. How would you rate the condition of drainage systems in your area?
 Very poor Poor Fair Good Very good
7. Blocked or inadequate drainage systems contribute to flooding in my area.
 Strongly agree Agree Neutral Disagree Strongly disagree
8. Does the community participate in drainage maintenance activities?
 Yes No

9. From your experience, how effective are community resilience strategies, such as drainage maintenance, in reducing the effects of floods in Kanyama Compound?

10. How effective are drainage systems in reducing flood impacts on your household?

Not effective Slightly effective Moderately effective Very effective

Section C: Effects of Disseminated Early Flood Warnings

11. Do you receive early flood warning information before flooding occurs?

Yes No

12. Source of flood warning information:

Radio Community leaders Mobile phone Neighbours Other

13. In what ways have disseminated early flood warnings influenced your household's preparedness and response to flooding.....?

14. Early flood warnings help my household prepare for floods.

Strongly agree Agree Neutral Disagree Strongly disagree

15. After receiving a flood warning, my household takes preventive action.

Always Sometimes Rarely Never

Section D: Effectiveness of Raising Floor Levels

16. Has your household raised floor levels to reduce flood impacts?

Yes No

17. Raising floor levels has reduced flood damage in my household.

Not at all To a small extent To a moderate extent To a large extent

18. Raising floor levels has reduced loss of household property during floods.

Strongly agree Agree Neutral Disagree Strongly disagree

19. Main challenge faced in raising floor levels:

High cost Lack of materials Limited space Lack of technical knowledge

20. How effective has raising floor levels been in minimizing flood impacts on your household compared to other strategies.....?

21. Considering drainage systems, early flood warnings, and raised floor levels, which strategy do you believe is most effective in reducing flood effects on households, and why?.....?